Statement of Basis

Construction Permit Application Review

GCC Dacotah

Rapid City, South Dakota

South Dakota Department of Environment and Natural Resources

1.0 Operational Description

1.1 Background

GCC Dacotah operates a Portland cement production facility in Rapid City, South Dakota under Title V air quality permit #28.1121-02 and Prevention of Significant Deterioration (PSD) air quality permit #28.1101-PSD. Operations at the facility include quarrying, crushing, raw material transfer and storage, calcining in rotary kilns, clinker transfer, finish mills, cement transfer and storage and product shipping.

1.2 Proposed Construction

On August 15, 2011, DENR received GCC Dacotah's application to construct and operate two new baghouses to capture and control particulate matter emissions. The new baghouses are associated with plans to begin the sale of cement kiln dust collected by the alkali bypass baghouse. This material is currently landfilled by GCC Dacotah. GCC Dacotah will also maintain the option of disposing the cement kiln dust from this baghouse to the quarry landfill. On August 23, 2011, DENR submitted a letter to GCC Dacotah stating the application was deemed technically complete but officially incomplete because the application fee was not included. GCC Dacotah submitted the application fee on September 16, 2011.

The application states there will be no changes to currently permitted production rates. This project does not involve any changes to processes and emissions upstream of where the cement kiln dust is generated. And the project only involves selling of cement kiln dust from the alkali bypass baghouse.

As a part of this project, GCC Dacotah will pneumatically transfer the cement kiln dust from the alkali bypass baghouse to an existing silo (Silo 39, which is currently used for cement storage and controlled by an existing baghouse EDCS27). EDCS27 also controls another cement storage silo 35. GCC Dacotah will now also use Silo 39 for cement kiln dust storage and install a new baghouse for this silo. cement kiln dust will be loaded to the trucks before being shipped off-site. A new baghouse EDCS51 will capture and control particulate matter emissions from the load out.

The following is the Department of Environment and Natural Resources' (DENR's) regulatory review and emission calculations based on the specifications listed in the application.

1.3 Potential Emissions

The proposed project will result in an increase of particulate matter (PM), particulate matter with an aerodynamic diameter of 10 microns or less (PM10), and particulate matter with an aerodynamic diameter of 2.5 micron or less (PM2.5) emissions at the facility due to the storage and unloading of cement kiln dust. Emission sources impacted by the project include the following:

- Silo 39 to be controlled by a new baghouse EDCTBD
- Transfer of cement kiln dust from the Silo 39 to Trucks controlled by a new baghouse EDC851
- Fugitive emissions from cement kiln dust hauling on existing paved roads

GCC Dacotah's application did not provide an emission estimate without controls. DENR estimated uncontrolled total suspended particulate (TSP), particulate matter less than 10 microns (PM10), and particulate matter less than 2.5 microns (PM2.5) emissions from GCC Dacotah processing 21,900 tons of cement kiln dust per year. GCC Dacotah's application indicates that four loads of cement kiln dust per day is produced and that each load is approximately 15 tons.

The uncontrolled total suspended particulate (TSP), particulate matter less than 10 microns (PM10), and particulate matter less than 2.5 microns (PM2.5) emission factors derived from EPA's AP-42, Tables 11.12-2, 06/06 are summarized in Table 1-1.

Table #1-1 – Uncontrolled Emission Factors (EF)

Process	(pounds per ton cement)		
	TSP	**PM10**	**PM2.5[1]**
Cement unloading to silo (Pneumatic)	0.73	0.47	0.08
Truck loading	1.12	0.31	0.06

[1] – The PM2.5 factor is estimated by multiplying the PM10 emission rate by 18%. The 18% is based on the ratio of uncontrolled emission rates listed for truck mix operations in EPA's AP-42 Table 11.12-3.

The uncontrolled emissions were calculated using equation 1-1.

Equation 1-1- Particulate Emission Calculation

$$Emission\left(\frac{ton}{year}\right) = 21{,}900\left(\frac{tons\ cement\ dust}{year}\right) x\ EF\left(\frac{pounds\ particulate}{ton\ cement\ dust}\right) \div 2{,}000\left(\frac{pounds\ particulate}{ton\ particulate}\right)$$

The controlled total suspended particulate (TSP), particulate matter less than 10 microns (PM10), and particulate matter less than 2.5 microns (PM2.5) are calculated based on the design of the baghouses associated with the cement kiln dust silo and loading to trucks. The application lists the manufacturer's designed emission rate of the silo and load out filter as 0.01 grains per cubic foot (grain / ft3) and the maximum air flow rate to the silo and load out filter as 2,100 and 1,300 cubic feet per minute (ft3 / min), respectively.

The controlled emissions were calculated using equation 1-2.

Equation 1-2- Particulate Emission Calculation

$$Emission\left(\frac{ton}{year}\right) = flow\ rate\left(\frac{ft3}{\min}\right) x\ 525{,}600\left(\frac{\min}{year}\right) x\ 0.01\left(\frac{grain}{ft3}\right) \div 7000\left(\frac{grain}{pound}\right) \div 2{,}000\left(\frac{pound}{ton}\right)$$

Emission increases associated with the proposed project will consist of total suspended particulate (TSP), particulate matter less than 10 microns (PM10), and particulate matter less than 2.5 microns (PM2.5). Table 1-2 lists the emission sources, the ton per year potential uncontrolled and controlled emissions, and the resulting potential increases for the project as a whole.

Table 1-2– Potential Emissions Increase

	Uncontrolled (tons/ year)	**Controlled (tons/ year)[1]**

Description	TSP	PM10	PM2.5	TSP	PM10	PM2.5
Silo 39	8.0	5.1	0.9	0.8	0.8	0.8
Load out	12.3	3.4	0.7	0.5	0.5	0.5
Fugitive Road [2]	1.0	0.2	0.0	0.1	0.0	0.0
Project total	**21**	**9**	**2**	**1**	**1**	**1**

[1] – DENR conservatively assumes emissions of PM10, PM2.5 and TSP are equivalent; and
[2] – Emission estimates provided in application.

2.0 Permit Requirements

2.1 New Source Review (NSR)

ARSD 74:36:10:01 notes that NSR regulations apply to areas of the state designated as nonattainment pursuant to the Clean Air Act for any pollutant regulated under the Clean Air Act. The facility is located in Rapid City, South Dakota, which is in attainment for all the pollutants regulated under the Clean Air Act, and therefore, not subject to new source review.

2.2 Prevention of Significant Deterioration (PSD)

GCC Dacotah is considered an existing major source under the Prevention of Significant Deterioration (PSD) program for particulate matter, sulfur dioxide, nitrogen oxides, and carbon monoxide. Any proposed change to the existing operation considered a major modification must go through a PSD review. A major modification under PSD is defined as any physical change or change in the method of operation of a major source resulting in a significant emissions increase of a regulated pollutant and a significant net emissions increase of that pollutant. A significant emissions increase under PSD is defined as a net emissions increase or the potential emissions increase that equals or exceeds the pollutant specific thresholds in 40 Code of Federal Regulation (CFR) § 52.21(b)(23)(i) and/or, major modifications constructed within 10 kilometers of a Class I area, that impact a Class I area equal to or greater than 1 microgram per cubic meter ($\mu g/m^3$) (24-hour average).

The facility is not within 10 kilometers of any Class I area and the comparison in Table 2-1 illustrates that no significance thresholds are exceeded, therefore PSD review is not applicable.

Table 2-1 – Regulated Air Pollutants Significant Emission Comparison

Pollutant	Project Potential Emissions	Significant Threshold	PSD Review Required
PM	1 tons/year	25 tons/year	No
PM10	1 tons/year	15 tons/year	No
PM2.5	1 tons/year	10 tons/year	No
SO^2	0 tons/year	40 tons/year	No
NOx	0 tons/year	40 tons/year	No
VOC	0 tons/year	40 tons/year	No
CO	0 tons/year	100 tons/year	No
Lead	0 tons/year	0.6 tons/year	No

Silo 39 was required by PSD permit 28.1101-PSD under Unit #24 to operate a baghouse with a particulate matter emission limit of 0.01 grains per dry standard cubic foot. The limit from this PSD permit for Silo will be incorporated into this permit.

2.3 New Source Performance Standards

DENR reviewed the new source performance standards in ARSD 74:36:07 as referenced to 40 CFR Part 60 and identified the following requirements that may apply.

2.3-1 ARSD 74:36:07:89 – 40 CFR, Part 60, Subpart F - Standards of Performance for Portland Cement Plants

The provisions of this subpart are applicable to the following facilities (constructed after August 17, 1971) in portland cement plants: Kiln, clinker cooler, raw mill system, finish mill system, raw mill dryer, raw material storage, clinker storage, finished product storage, conveyor transfer points, bagging and bulk loading and unloading systems.

In accordance with 40 CFR 60.62 the proposed units are subject to an opacity limit of 10% and recordkeeping, reporting, and monitoring requirements.

The applicable MACT Standard, Subpart LLL of Part 63 discussed in section 2.4 below, includes an exemption from the less stringent Subpart in a case where two applicable Clean Air Act Subparts have different requirements for the same pollutant. MACT Subpart LLL also limits opacity to 10% but has more performance testing, recordkeeping, reporting, and monitoring requirements. Based on the additional requirements, in Subpart LLL DENR believes the MACT Standard is more stringent. Therefore the proposed equipment is exempt from NSPS Subpart F as described under 40 CFR 63.1356.

2.4 Maximum Achievable Control Technology Standards

DENR reviewed the new source performance standards in ARSD 74:36:07 as referenced to 40 CFR Part 63 and identified the following requirements that may apply.

2.4-1 ARSD 74:36:08:21 – 40 CFR, Part 63, Subpart LLL - National Emission Standards for Hazardous Air Pollutants From the Portland Cement Manufacturing Industry

The relative provisions of this subpart are those applicable to conveying systems and bulk loading and unloading system at any portland cement plant. The silo and loading systems are applicable to this subpart.

2.5 State Requirements

In accordance with ARSD 74:36:20, GCC Dacotah is required to submit an application for a construction permit since the proposed change is considered a modification under its Title V permit. GCC Dacotah is required to submit an application to modify its Title V operating permit within 12 months of the first initial startup of a proposed source.

2.5-1 Particulate Matter Emission Limits

In accordance with ARSD 74:36:06:01, any unit required to be permitted must comply with the states' particulate matter and sulfur dioxide standards and requirements. In accordance with ARSD 74:36:06:01, the particulate matter and sulfur dioxide emission limits in ARSD 74:36:06 are not applicable if a particulate matter and sulfur dioxide emission limit specified in ARSD 74:36:07 (NSPS), ARSD 74:36:08 (MACT) ARSD 74:36:09 (PSD), ARSD 74:36:10 (NSR) or ARSD 74:36:16 (Acid Rain) is applicable. The silo was required to install and operate a baghouse with a particulate matter emission limit under a PSD permit. Even with the noted changes, the PSD limit still applies to the silo. Therefore, the silo is not applicable to South Dakota's particulate matter emission standards.

The identified systems do not emit sulfur dioxide. Therefore, these systems are not applicable to South Dakota's sulfur dioxide emission standards.

2.5-2 Visible Emission Limit

In this case, the department is placing visible emission limits based on the requirements of the applicable federal standards. These limits (10% opacity) are more stringent than the state limits.

2.5-3 Performance Tests

Initial performance tests are required to demonstrate compliance with the visibility limits in 40 CFR Part 63, Subpart LLL. DENR will accept a passing opacity test result as demonstration of compliance with the particulate limit. The permit will also include language that allows DENR to require additional testing at the Secretary's discretion.

3.0 Recommendation

GCC Dacotah is required to operate the proposed units within the requirements stipulated in the following regulations:

- ARSD 74:36:06 – Regulated air pollutant emissions;
- ARSD 74:36:07 – New source performance standards;
- ARSD 74:36:08 – National emission standards for hazardous air pollutants
- ARSD 74:36:11 – Stack performance testing;
- ARSD 74:36:12 – Control of visible emissions; and
- ARSD 74:36:20 – Construction permits for new sources or modifications.

Based on the information submitted in the air quality permit application, the department recommends conditional approval of a construction permit for GCC Dacotah's Rapid City cement plant. Questions regarding this permit review should be directed to Jim A. Anderson, Air Quality Engineer II.